

MITES OF THE FAMILY BDELLIDAE

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Comparatively little is known of the Bdellidae of the Western Hemisphere although they are widely distributed and of rather common occurrence. In order to extend our knowledge, this paper is being presented as the first of a contemplated series on this family of predaceous, prostigmatic Acarina. Since Sig Thor (Das Tierreich, 1931) has already discussed the family and has covered the European field, as Womersley (Roy Soc. South Australia, Trans., 57: 97-107, 1933) has done for the Australian species, it is hoped that this and the following papers will serve the same purpose for the North American forms, both new and already described. The types and cotypes, and the slide of *Biscirus lapidarius*, will be deposited in the United States National Museum, Washington, D. C.

MONOTRICHOBDELLA, new genus.

This genus is close to *Biscirus* in that it has the long 5th palpal segment which does not enlarge toward the tip, three pairs of dorsal thoracic hairs, no sclerotized plates, and differs in that the 5th palpal segment has only one long hair placed on the tip in place of the customary two; there is also present what is either an anterior median eye or a tubercle. *Monotrichobdella max-osburni* is designated as the type of the genus.

Monotrichobdella max-osburni, new species

(Figs. 1, 2)

Female.—A large, reddish, rounded egg-shaped mite; rostrum moderately long and slender. Palpus of moderate length, slender, the 5th segment characteristic in that it is long, slender, and narrowing toward the tip, and has only one long end hair (211 μ long); also 3 other short fine hairs; 5th segment 98.4 μ long and 19.6 μ wide; 4th segment 33.3 μ long and 16 μ wide, with 2 minute hairs; 3rd segment 37 μ long and 22 μ wide, with one minute hair; 2nd segment 168 μ long and 22 μ wide, with 2 minute hairs. Mandibles with 2 dorsal hairs, the proximal about in center, the distal about five-sixths from base; mandible 297 μ long and 45 μ wide (about $6\frac{1}{2}$ times as long as wide), fine shears. Rostrum with 2 pairs of fine, apical hairs, and 2 pairs of ventral hairs. Thorax with 2 pairs of lateral eyes, and what is either an anterior median eye (as in *Cyta*) or a tubercle; no sclerotized shields; the striations, in the area formed by the 4 thoracic sensory hairs, break up into an irregular, broken-lined pattern surrounding the 2 median posterior thoracic hairs; the sensory hairs are simple, about 116 μ long; one pair of thoracic hairs, 56 μ long, in row with the posterior sensory hairs. Abdominal hairs 56 μ long; posterior abdominal hairs about 66 μ long. Anal opening of female with 2 pairs of anterior hairs. Female with 9

pairs of genital hairs. Legs appearing normal; distal ventral hairs of tarsi pilose; leg IV slightly past tip of posterior edge of body; legs I, II, and III small; IV slightly larger; leg I about $517\ \mu$ long; IV about $697\ \mu$ long. Body length with rostrum $1440\ \mu$, width about $675\ \mu$.

Type.—U. S. National Museum No. 1459.

The type and several paratypes were taken from lichens on the Mexico-Cuernavaca Highway near Tres Cumbres, Morelos, January 7, 1943; collected by J. W. Balock and J. G. Shaw. This species is named for Max Osburn of the Fort Pierce, Fla., Laboratory.

***Biscirus lapidarius* (P. Kram.)**

(Figs. 3, 4, 5)

See Sig Thor. 1931. Das Tierreich, v. 56, p. 49.

This species is very close to *Biscirus lapidarius*, which has a rather general distribution in Europe and a questionable recording from Central America. The only difference that can be seen is that it appears to lack a hair on the 5th palpal segment. The following description is based on the Mexican form:

Female.—Large; brown, with darker dorsal spots. Rostrum slightly long and narrow. Palpus of medium length and normal thickness; 5th palpal segment $83.3\ \mu$ long and $21\ \mu$ wide, with 5 shorter hairs and 2 end hairs, 111 and $116\ \mu$ long; 4th segment $22.2\ \mu$ long and $16.5\ \mu$ wide, with 3 hairs; 3rd segment $22.2\ \mu$ long and $22.2\ \mu$ wide, with 1 lateral hair; 2nd segment $89\ \mu$ long and $22.2\ \mu$ wide, with 5 lateral hairs. Mandibles $205\ \mu$ long and $44.4\ \mu$ wide (almost 5 times as long as wide), the proximal hair about one-fifth out from base, the distal hair about in center. Rostrum with 2 pairs of tiny tip hairs and 6 pairs of ventral hairs. Thorax without dorsal shield lines; anterior sensory hairs $128\ \mu$ long, posterior $133\ \mu$ long; posterior thoracic hair $89\ \mu$ long. Lateral eyes widely separated. Abdominal setae $67\ \mu$ long. Genital opening with 7 pairs of hairs. Legs normal; distal tarsal hairs pilose. Length with rostrum $1133\ \mu$, width about $466\ \mu$.

A single specimen was obtained from moss collected by E. W. Baker at the Desierto de los Leones, Mexico, February 7, 1943.

***Bdella chapultepecensis*, new species**

(Figs. 6, 7, 8)

Female.—Of medium size, somewhat narrow; color reddish. Mandibles and rostrum somewhat narrow. Palpus of normal thickness, short; 5th segment normal, $35.5\ \mu$ long and $16.6\ \mu$ wide, with 3 short hairs and 2 end hairs, the inner hair $100\ \mu$ long, the outer hair broken off at base; 4th segment $16.6\ \mu$ long and $11\ \mu$ wide, with 3 short hairs; 3rd segment $22.2\ \mu$ long and $16.6\ \mu$ wide, with one outer hair; 2nd segment $100\ \mu$ long and $16.6\ \mu$ wide, with 5 short hairs.

Mandibles 165 μ long and 27 μ wide (6 times as long as wide), the basal hair about one-fourth out from base and the distal hair about five-eighths out. Rostrum with 2 pairs of fine tip hairs and 2 pairs of ventral hairs. Thorax without shield lines; thoracic sensory hairs 89 μ long; anterior thoracic hairs 25 μ long, posterior thoracic hairs 33.3 μ long. Abdominal dorsal hairs 27.7 μ long, posterior abdominal hairs 39 μ long. Anal opening on rear and ventral, with 1 pair of anterior hairs. Apparently 12 pairs of genital hairs. Legs normal; distal ventral tarsal hairs simple; approximate lengths of legs: I, 266 μ ; II, 244 μ ; III, 333 μ ; IV, 355 μ . Length with rostrum 684 μ , width about 200 μ .

Type.—U. S. National Museum No. 1460.

Type specimen taken from lichens, Chapultepec Park, Mexico, D. F., March 16, 1943, by E. W. Baker.

The rostral hairs and genital opening characterize this species.

Bdella rio-lermensis, new species

(Figs. 9, 10, 11)

Female.—Medium sized mite; egg shaped; amber to red with lighter-colored legs and beak and with darker markings on thorax and abdomen. Rostrum broad at base and narrow at tip. Palpus of normal length and size; 3rd segment reaching to tip of rostrum; 5th segment typical, 36.6 μ long and 16.6 μ wide, the end hairs 155 μ and 122 μ long, and with 3 medium-length lateral hairs; 4th segment 14.4 μ long and 14.4 μ wide, with 3 hairs; 3rd segment 22.2 μ long and 17.7 μ wide, with 1 hair; 2nd segment 111 μ long and 16.6 μ wide, with 6 short hairs. Mandibles 177 μ long and 33.3 μ wide (5.3 times as long as wide), proximal hair about one-fourth from base, distal hair about five-eighths from base; shears fine. Rostrum with 2 pairs of fine apical hairs and 2 pairs of ventral hairs. Thorax with 4 pairs of dorsal hairs; anterior sensory setae 88.8 μ long, posterior sensory setae 100 μ long; posterior thoracic hairs 38.8 μ long; Apparently a fine sclerotized plate on thorax. Abdominal dorsal hairs 33.3 μ long; posterior abdominal hairs about 44.4 μ long. Female with 9 pairs of genital hairs. Legs appearing normal; all tarsal hairs simple; approximate leg lengths: I, 311 μ ; II, 266 μ ; III, 355 μ ; IV, 444 μ . Length with rostrum 800 μ , width 311 μ .

Tritonymph about same except having 5 pairs genital hairs.

Type.—U. S. National Museum No. 1461.

The type was taken from moss collected by E. W. Baker on the Mexico-Toluca Highway near Rio Lerma, Mexico, January 24, 1943.

The very faint dorsal shield lines and rostral hair pattern are distinctive of this species.

Bdella cronini, new species

(Figs. 12, 13)

Female.—Body long, somewhat pear shaped; red, with darker dorsal markings. Rostrum somewhat elongated. Palpus long, narrow; 5th segment

typical, 39 μ long and 16.6 μ wide, 4 short hairs and 2 long end hairs, 122 μ and 200 μ long; 4th segment 22 μ long and 14.4 μ wide, with 4 short hairs; 3rd segment 22.2 μ long and 16.6 μ wide, with 1 hair; 2nd segment 122 μ long and 16.6 μ wide, with 6 hairs. Mandibles 188 μ long and 33.3 μ wide (about 5½ times as long as wide); the proximal hair about one-third out from base and the distal hair about two-thirds out. Rostrum with 2 pairs of tiny tip hairs and 2 pairs of ventral hairs. Thorax without shield lines; anterior sensory hair 144 μ long, posterior 211-222 μ long; anterior thoracic hair 55.5 μ long, posterior thoracic hair 70 μ long. Dorsal abdominal hairs about 66.6 μ long; posterior abdominal hairs about 77.7 μ long. Anal opening with 2 pairs of hairs. Seven pairs of genital hairs. Legs normal; ventral distal tarsal hairs simple; length of legs about: I, 360 μ ; II, 315 μ ; III, 360 μ ; IV, 495 μ . Length 844 μ , width 388 μ .

Type.—U. S. National Museum No. 1462.

The type was collected from lichens by E. W. Baker from fig trees at Planada, Calif., June 13, 1936; paratypes from lichens from Planada, Calif., June 12, 1936, and 1937. Named for T. C. Cronin.

The lack of shield, the rostral hairs, the shape of mouth parts, etc., are distinctive of this species.

Bdella virgata Ewing

(Figs. 14-16)

Bdella virgata Ewing, 1909. Univ. Ill. Bul. vol. VII, p. 70.

Female.—Medium to large mite, pear shaped; reddish with darker dorsal markings. Palpus and rostrum small for size of body. Palpus short; 5th segment 39 μ long and 17.7 μ wide, with 4 short hairs and 2 terminal hairs, 166 μ and 111 μ long; 4th segment 16.6 μ long and 11.1 μ wide, with 4 short hairs; 3rd segment 28 μ long and 19 μ wide, with 1 short hair; 2nd segment 111 μ long and 19.4 μ wide with 6 short hairs. Rostrum with 2 pairs of fine tip hairs and 2 pairs of ventral hairs, and posteriorly a pair of tiny lateral hairs. Mandibles 166 μ long. Thorax without shield; anterior thoracic hairs 28 μ long; sensory setae 78 μ long. Abdominal setae 33.3 μ long. Twelve pairs of genital hairs. Legs normal; ventral distal tarsal hairs simple. Length with rostrum 933 μ .

Redescribed from Mexican material. The type in H. E. Ewing's collection, as far as can be determined, has 9 pairs of genital hairs (perhaps a male).

One adult specimen from lichens collected by E. W. Baker on the Mexico-Toluca Highway, near Rio Lerma, Mexico, January 24, 1943. Nymphs from moss collected by Mr. Donald Dodds at Valle del Bravo, Mexico, May 8, 1943.

The rostral hairs are distinctive of this species.

Bdella distincta, new species

(Figs. 17-19)

Female.—Medium size mite, egg-shaped. Color unknown as described from

mounted specimens. Palpus short; 5th segment only slightly widening distally, 50 μ long by 16.6 μ wide, end hairs 150 μ long and 100 μ long respectively, a long distal lateral hair and 2 shorter lateral hairs; 4th segment 16.6 μ long by 14.4 μ wide with 3 short hairs; 3rd segment 22.2 μ long by 22.2 μ wide with a single short hair; 2nd segment 83.2 μ long by 22.2 μ wide with 4 hairs, the basal being the longest. Mandibles 177 μ long by 44.4 μ wide, 4 times as long as wide, the basal hair 22.2 μ from base of mandible, the distal hair at center. Rostrum with 6 pairs ventral hairs. Thorax with 4 pairs hairs; possibly a faint chitinous shield running from posterior to anterior sensory setae; anterior sensory setae about 89 μ long, posterior about 111 μ long. Dorsal body hairs as illustrated, about 39 μ long. Eight pairs of genital hairs. Legs normal, approximate lengths: I and II, 266 μ ; III and IV, 311 μ . Body length with rostrum 768 μ , width 333 μ .

Cotypes.—U. S. National Museum No. 1463.

Two cotypes, one from pine cones, Hawaii at Houston, Texas, October 18, 1934, by O. D. Morris; the other from *Bambusa parvariabilis*, China at Washington, D. C., January 29, 1941 (collector's name not given).

The dorsal hairs are quite distinctive.

***Bdella oblonga* Say**

(Figs 20–23)

Bdella oblonga Say 1821. Acad. Nat. Sci. Phila., Jour., 2; 74.

Bdella cardinalis Banks 1894, Amer. Ent. Soc., Trans. 21:219.

Bdella oblonga Say, Jacot, A. P., 1938, Psyche, 45 (2–3): 126–128.

Female.—Large, egg-shaped; light red, with a lighter dorsal stripe. Palpus of moderate length, 3rd segment reaching to tip of rostrum; 5th segment long, enlarging normally toward tip 90 μ long and 29 μ wide, with 2 end hairs, 228 μ and 191 μ long, 5 other medium-length hairs; 4th segment 33 μ long and 26 μ wide, with 4 short hairs; 3rd segment 33 μ long and 31 μ wide, with 1 short hair; 2nd segment 180 μ long and 33.3 μ wide, with about 11 short hairs. Mandibles 279 μ long and about 72 μ wide (about 4 times as long as broad), the proximal hair in the basal one-fourth of the segment and the distal about four-sevenths out from base. Rostrum normal, with 2 pairs of fine tip hairs and 6 pairs of ventral hairs. Thorax with strong sclerotized shields¹ connected anteriorly, and on the lateral sides the shields forming a netlike pattern. Anterior sensory setae 116 μ long; posterior sensory setae 133 μ long. Anterior thoracic hairs 46.6 μ long; posterior thoracic hairs 67.7 μ long. Abdominal hairs 89 μ long, and posterior abdominal hairs 105.5 μ ; abdominal shoulder hair 105.5 μ long. Anal opening on rear and ventral, with 4 pairs of surrounding hairs. Seven pairs of genital hairs. Legs normal; distal ventral hairs of tarsi pilose; approximate leg lengths: I, 693 μ ; II, 585 μ ; III, 702 μ ; IV, 765 μ . Body length with rostrum 1273 μ , width about 558 μ .

¹ Those mites taken from alcohol had the sclerotized shield bleached, which made it difficult to find. Mites mounted immediately upon discovery had the shields blackish.

The Mexican material consists of a female taken from moss and lichens on the west slope of Mt. Popocatépetl, near the Pass of Cortes, at about 12,000 ft. elevation, December 29, 1942. Another was taken from moss at the Desierto de los Leones, Mexico, December 5, 1943; both collections made by E. W. Baker. Dr. F. Bonet collected four others, one from Monterrey, Nuevo Leon, July 15, 1942; two from Linares, Nuevo Leon, July 13, 1942; and one from Atoyac, Veracruz, May 30, 1941. It is also found from Texas to the east coast of the United States.

Dr. H. E. Ewing has in his personal collection a slide with a single female labeled *Bdella cardinalis* Banks; it was taken under bark of oak, Marshall, Illinois, October 10, 1908.

The bridged shield pattern with few reticulations is the principal difference between this species and *Bdella semiscutata* Sig Thor.

***Bdella mexicana*, new species**

(Figs. 24, 25, 26)

Female.—Small, narrow mite, not rounded as is *Bdella virgata*; abdominal shoulders strong. Palpus short, tip reaching about to tip of rostrum, but in situ much shorter; 2nd and 3rd segments greatly enlarged; 5th segment only slightly enlarged toward tip, 44 μ long and 12 μ wide, end hairs 90 and 76.5 μ long, and 4 other hairs, 1 minute; 4th segment 20 μ long and 12 μ wide, 3 small hairs; 3rd segment 22 μ long and 22 μ wide, 1 small hair; 2nd segment enlarged distally, 55 μ long and 25 μ wide, with about 6 short hairs. Mandibles 150 μ long and 38 μ wide (4 times as long as wide), basal hair one-sixth out from base, distal hair half way out. Rostrum normal, with 2 pairs of tiny tip hairs and 6 pairs of ventral hairs. Thorax without dorsal shields; anterior sensory hairs 88 μ long, posterior sensory hairs about 111 μ long; anterior thoracic hairs 22 μ long, posterior thoracic hairs 27 μ long. Dorsal abdominal hairs 35.5 μ long; abdominal shoulder hairs 66 μ long; posterior abdominal hairs about 44 μ long. Anal opening on rear, with 3 pairs of anal hairs, one anterior-ventral, one centro-posterior, and one dorso-posterior. Eight pairs of genital hairs. Legs appearing normal; distal ventral tarsal hairs pilose; hairs on tarsus I long and numerous. Leg I about 233 μ long; II shorter; III reaching about to posterior margin of body; IV slightly past margin of body. Length with rostrum 540 μ , width at thorax 180 μ , at abdominal shoulders 235 μ .

Type.—U. S. National Museum No. 1464.

The type specimen was taken from moss collected by Mr. Donald Dodds at Valle del Bravo, Mexico, March 4, 1943. Paratype female from moss collected by E. W. Baker at Laguna de Zempoala, Morelos, Mexico, January 31, 1943.

The body shape and rostral hairs distinguish this species from the other closely related ones.

Bdella willisi, new species

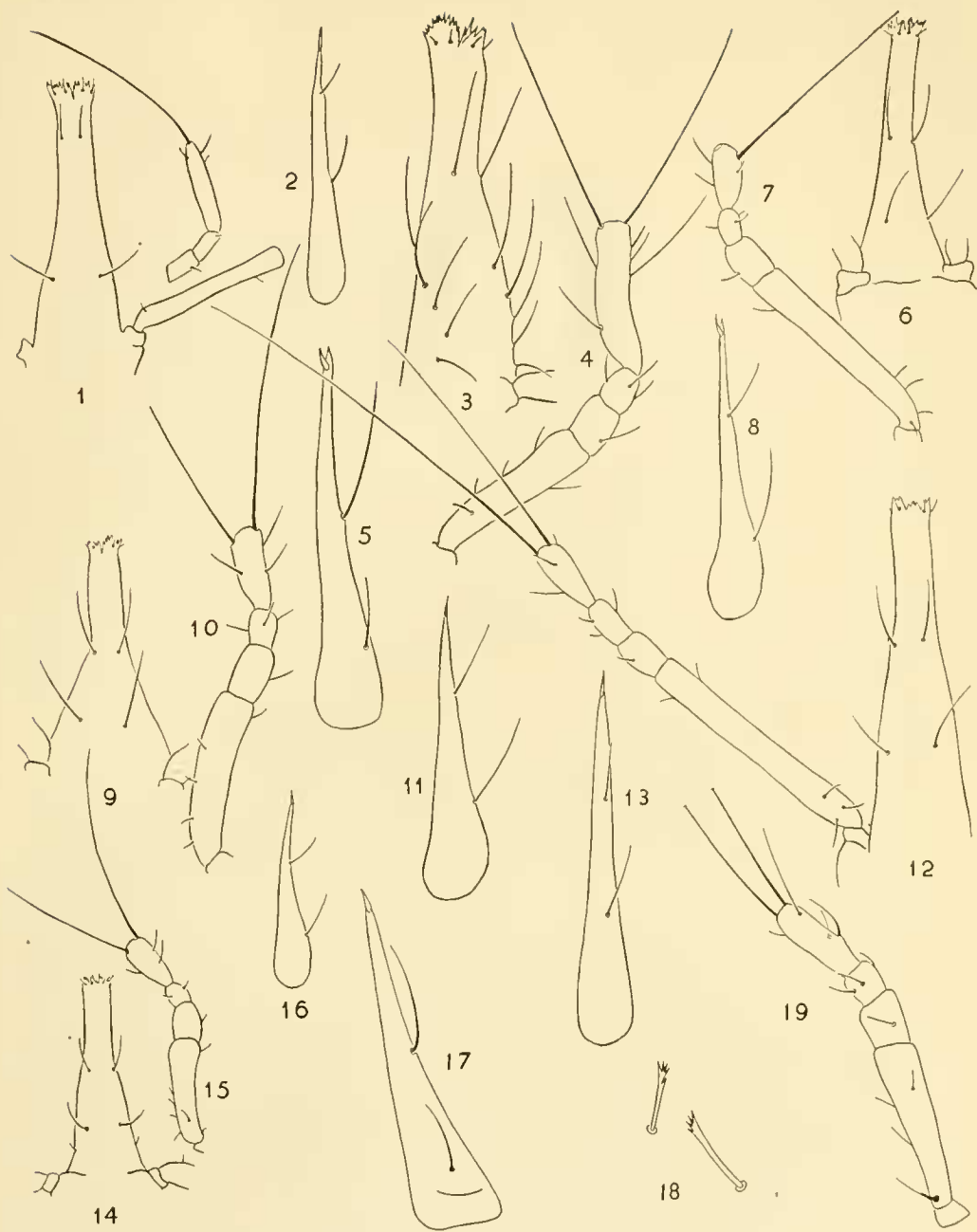
(Figs. 27, 28, 29)

Female.—Smallish, somewhat elongated mite, with strong (wide) abdominal shoulders; body color dark, with lighter thorax and legs. Palpus short, strong, elbowed, in situ not reaching tip of mandible; 5th segment only slightly enlarged toward tip, 44.4 μ long and 13.3 μ wide, 2 end hairs 100 and 78 μ long, 3 other short hairs; 4th segment 15.5 μ long and 13.3 μ wide, with 4 short, fine hairs; 3rd segment 22.2 μ long and 22.2 μ wide, with 1 fine hair; 2nd segment 55.5 μ long and 22.2 μ wide, with 4 tiny hairs, small at base and greatly enlarged at distal end. Mandibles 151 μ long and 38 μ wide (4 times as long as broad), the proximal hair in the lower fourth of the segment and the distal past the center. Rostrum of normal size, with 2 pairs of fine tip hairs and 6 pairs of ventral hairs. Thorax without sclerotized plates; posterior and anterior sensory setae about 78 μ long; posterior thoracic setae 28 μ long, anterior pair 22 μ long. Dorsal abdominal setae 30 μ long; posterior abdominal setae about 40 μ long. Anal opening with 3 pairs of longish hairs. Eight to nine pairs of fine genital hairs. Legs appearing normal; distal ventral tarsal hairs pilose; approximate leg lengths: I, 292 μ ; II, 225 μ ; III, 283 μ ; IV, 297 μ . Body length with rostrum 667 μ , width of abdomen 235 μ , width of thorax 189 μ .

Type.—U. S. National Museum No. 1465.

The type slide of mites from moss, Laguna de Zempoala, Morelos, Mexico, January 31, 1943; paratype slide of mites from lichens, Chapultepec Park, Mexico, D. F., January 3, 1943; collected by E. W. Baker. Named for C. C. Willis.

The 5th palpal segment, rostral hairs, etc., appear to be distinctive to this species.



Monotrichobdella max-osburni, n. sp. Fig. 1, Venter of rostrum. Fig. 2, Mandible.

Biscirus lapidarius (P. Kram.). Fig. 3, Venter of rostrum. Fig. 4, Palpus. Fig. 5, Mandible.

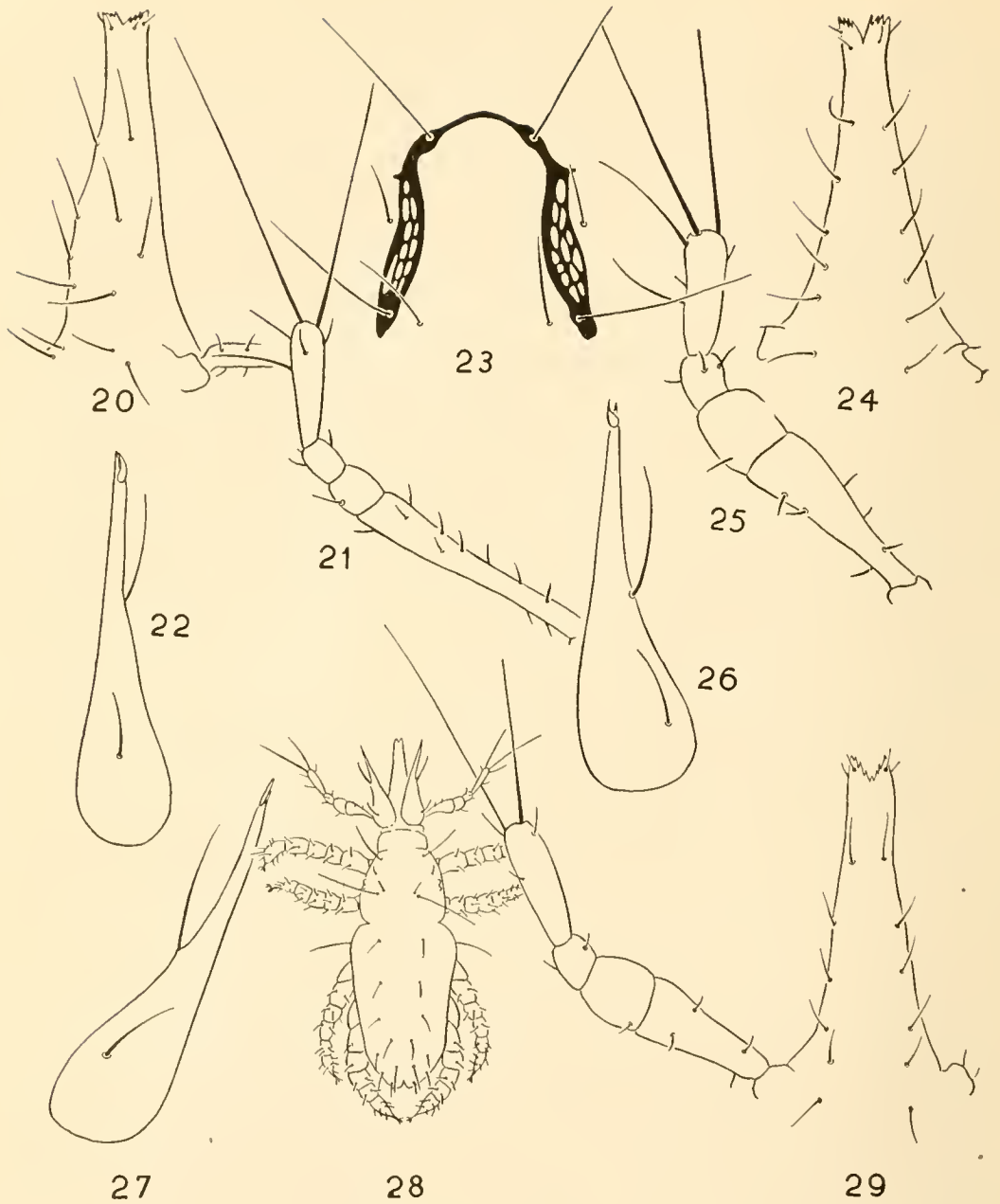
Bdella chapultepecensis, n. sp. Fig. 6, Venter of rostrum. Fig. 7, Palpus. Fig. 8, Mandible.

Bdella rio-lermensis, n. sp. Fig. 9, Venter of rostrum. Fig. 10, Palpus. Fig. 11, Mandible.

Bdella cronini, n. sp. Fig. 12, Venter of rostrum, and palpus. Fig. 13, Mandible.

Bdella virgata Ewing. Fig. 14, Venter of rostrum. Fig. 15, Palpus. Fig. 16, Mandible.

Bdella distincta, n. sp. Fig. 17, Mandible. Fig. 18, Dorsal body hairs. Fig. 19, Palpus.



Bdella oblonga Say. Fig. 20, Venter of rostrum. Fig. 21, Palpus. Fig. 22, Mandible. Fig. 23, Dorsal shield.

Bdella mexicana, n. sp. Fig. 24, Venter of rostrum. Fig. 25, Palpus. Fig. 26, Mandible.

Bdella willisi, n. sp. Fig. 27, Mandible. Fig. 28, Adult. Fig. 29, Venter of rostrum, and palpus.